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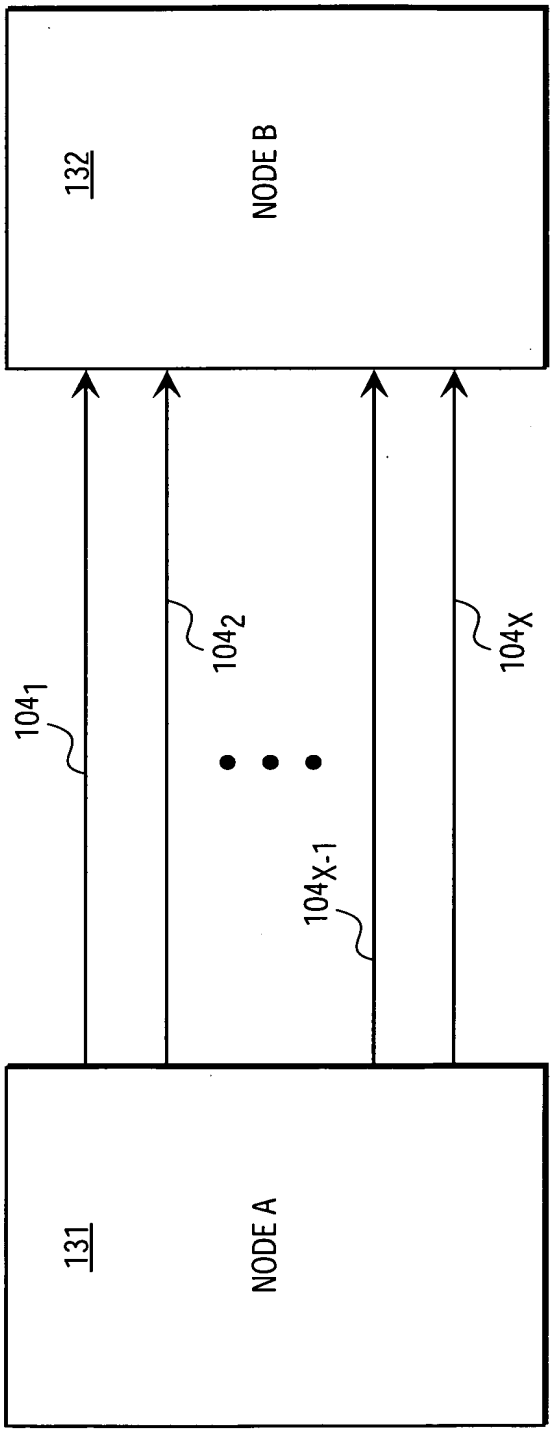


FIG. 1

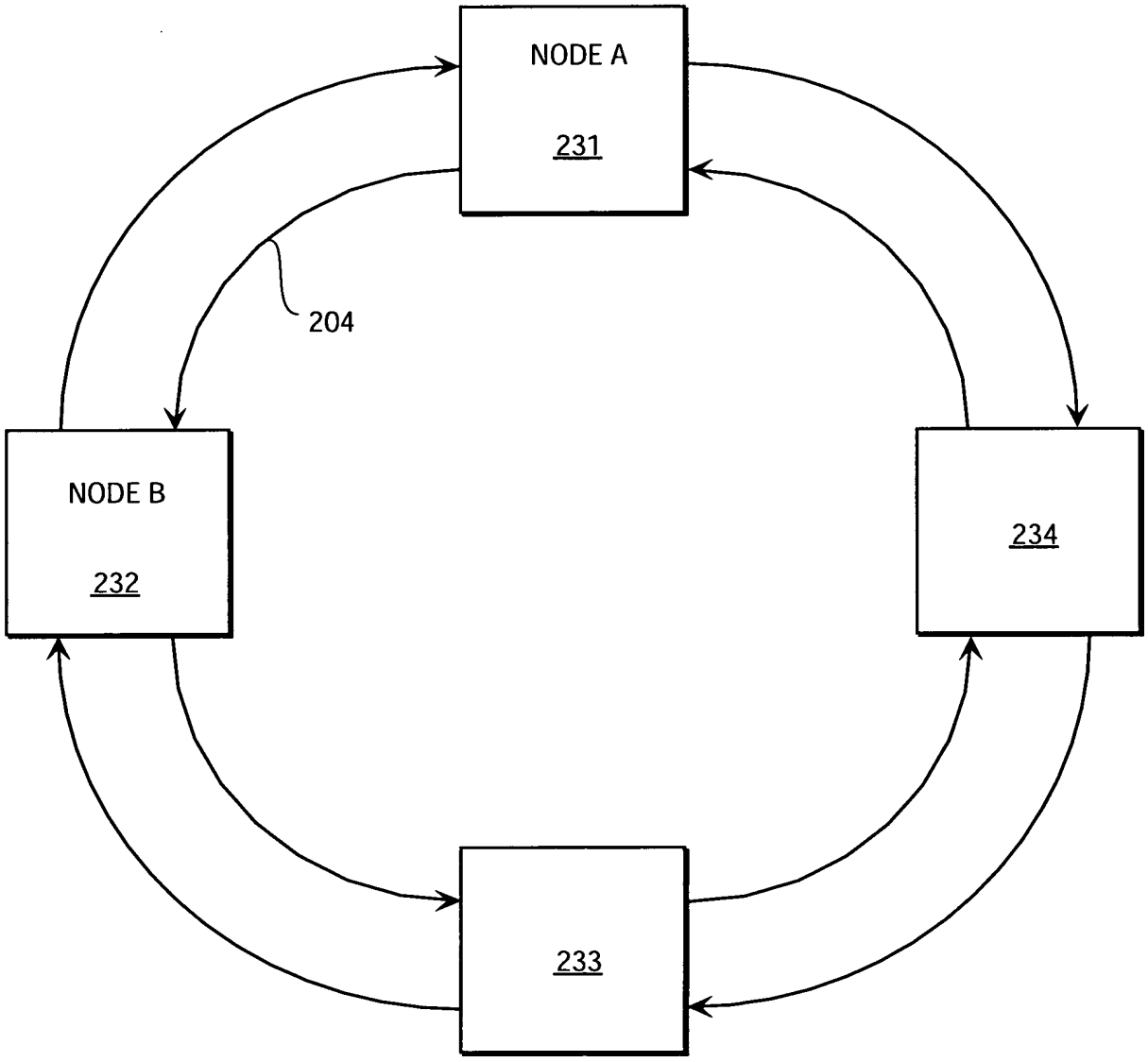


FIG. 2

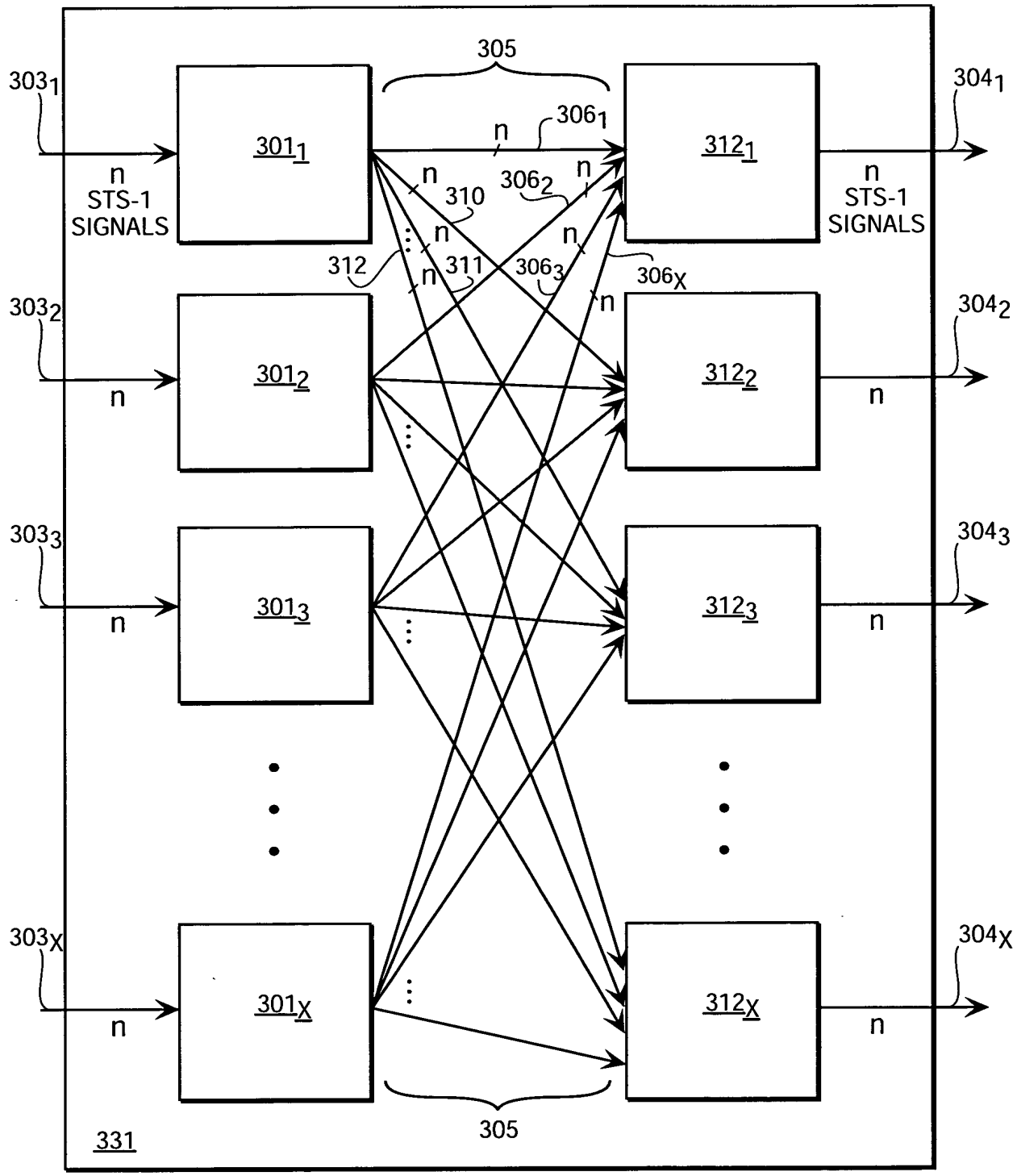

303₁
303₂
303₃
303X
n
STS-1
SIGNALS
301₁
301₂
301₃
301X
305
306₁
306₂
306₃
306X
310
311
312
312₁
312₂
312₃
312X
304₁
304₂
304₃
304X
331

FIG. 3

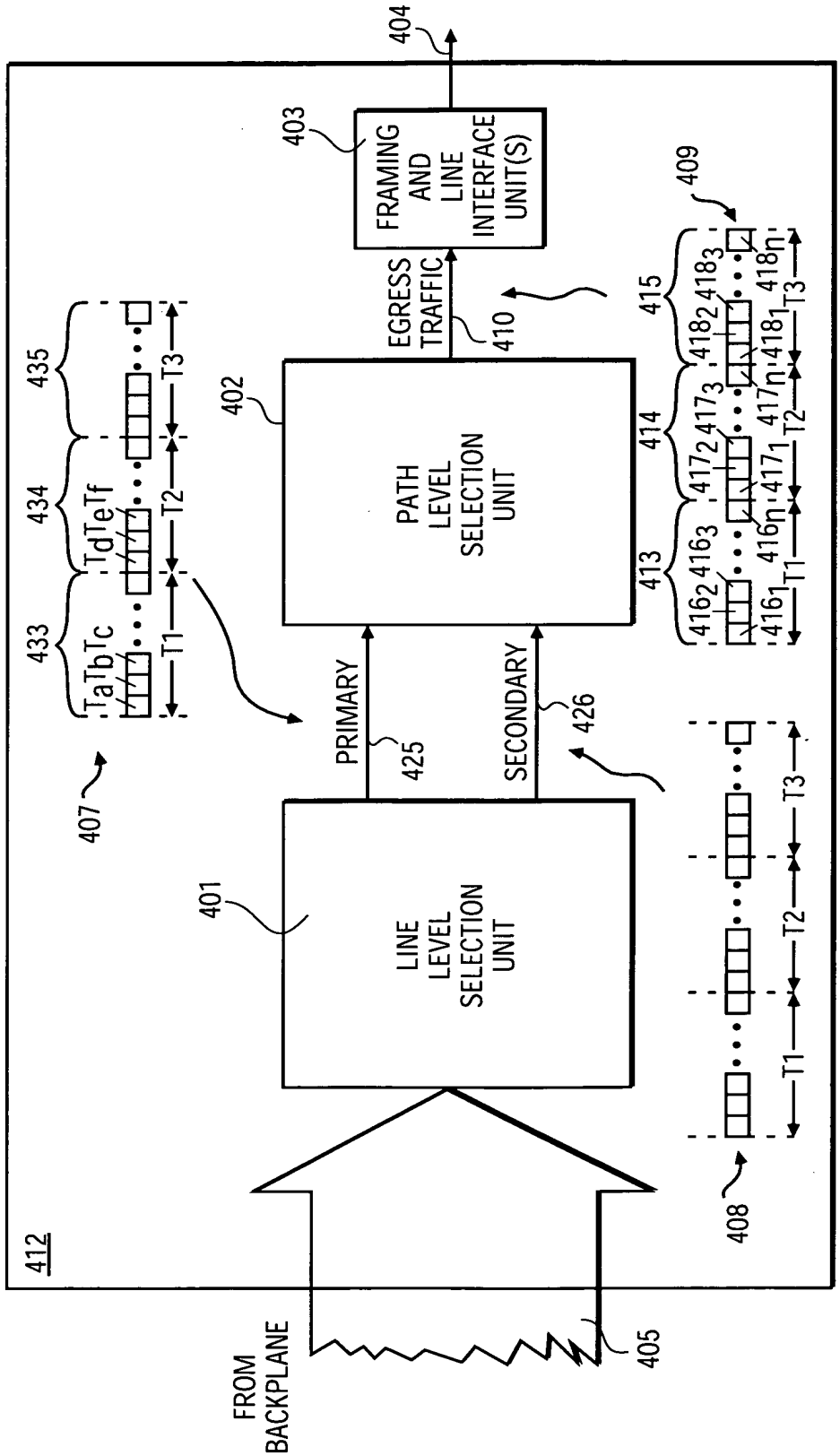

412
FROM BACKPLANE
405
LINE LEVEL SELECTION UNIT
401
PATH LEVEL SELECTION UNIT
402
FRAMING AND LINE INTERFACE UNIT(S)
403
404
PRIMARY
425
SECONDARY
426
EGRESS TRAFFIC
410
407
408
409
433
434
435
413
414
415
T1
T2
T3
Ta Tb Tc
Td Te Tf
416 1 416 2 416 3 416 n
417 1 417 2 417 3 417 n
418 1 418 2 418 3 418 n

FIG. 4

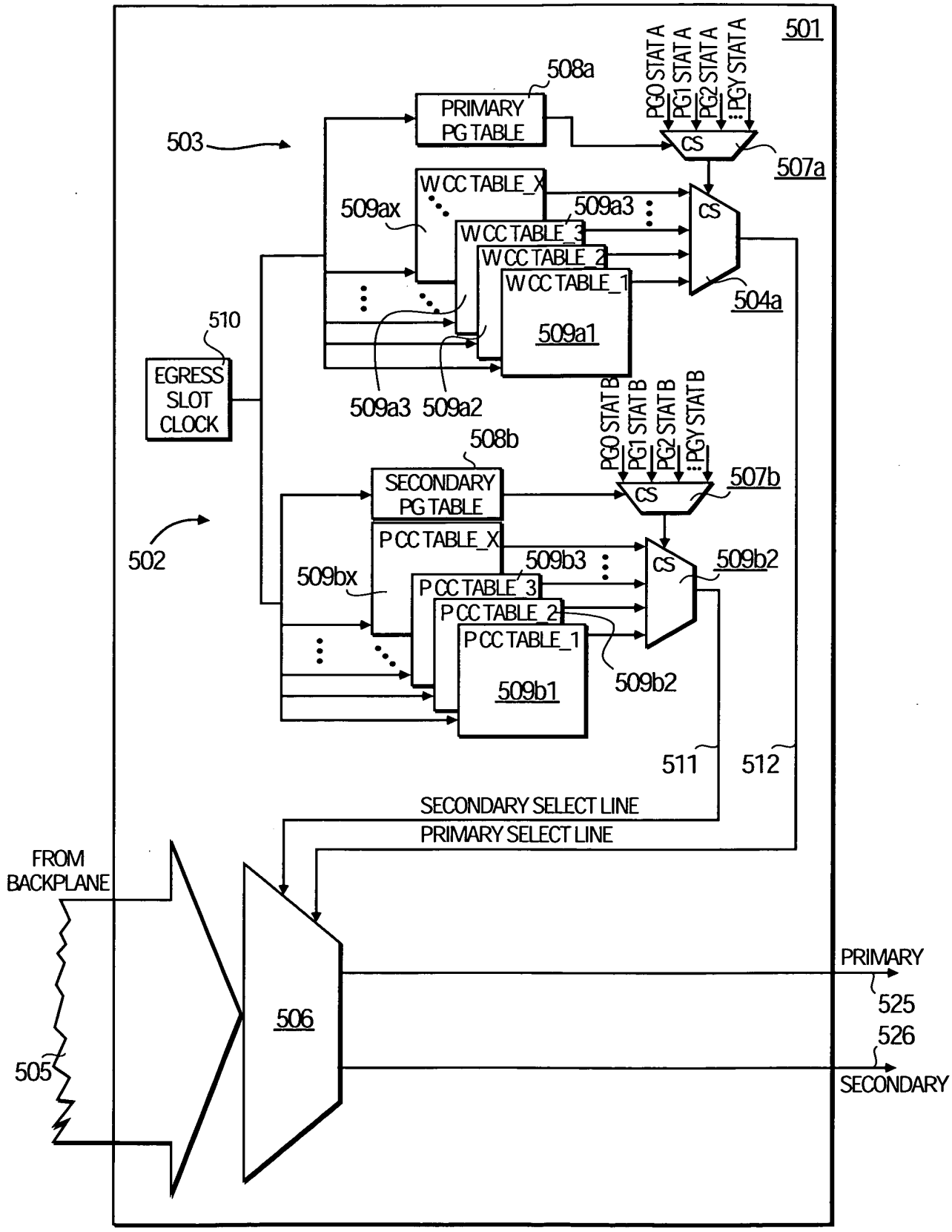

501
PG0 STAT A
PG1 STAT A
PG2 STAT A
PGY STAT A
508a
PRIMARY PG TABLE
503
CS
507a
WCC TABLE_X
509ax
509a3
WCC TABLE_3
WCC TABLE_2
WCC TABLE_1
509a1
504a
510
EGRESS SLOT CLOCK
509a3
509a2
PG0 STAT B
PG1 STAT B
PG2 STAT B
PGY STAT B
508b
SECONDARY PG TABLE
507b
502
PCC TABLE_X
509b3
509b2
509bx
PCC TABLE_3
PCC TABLE_2
PCC TABLE_1
509b1
509b2
511
512
SECONDARY SELECT LINE
PRIMARY SELECT LINE
FROM BACKPLANE
506
505
PRIMARY
525
526
SECONDARY

FIG. 5

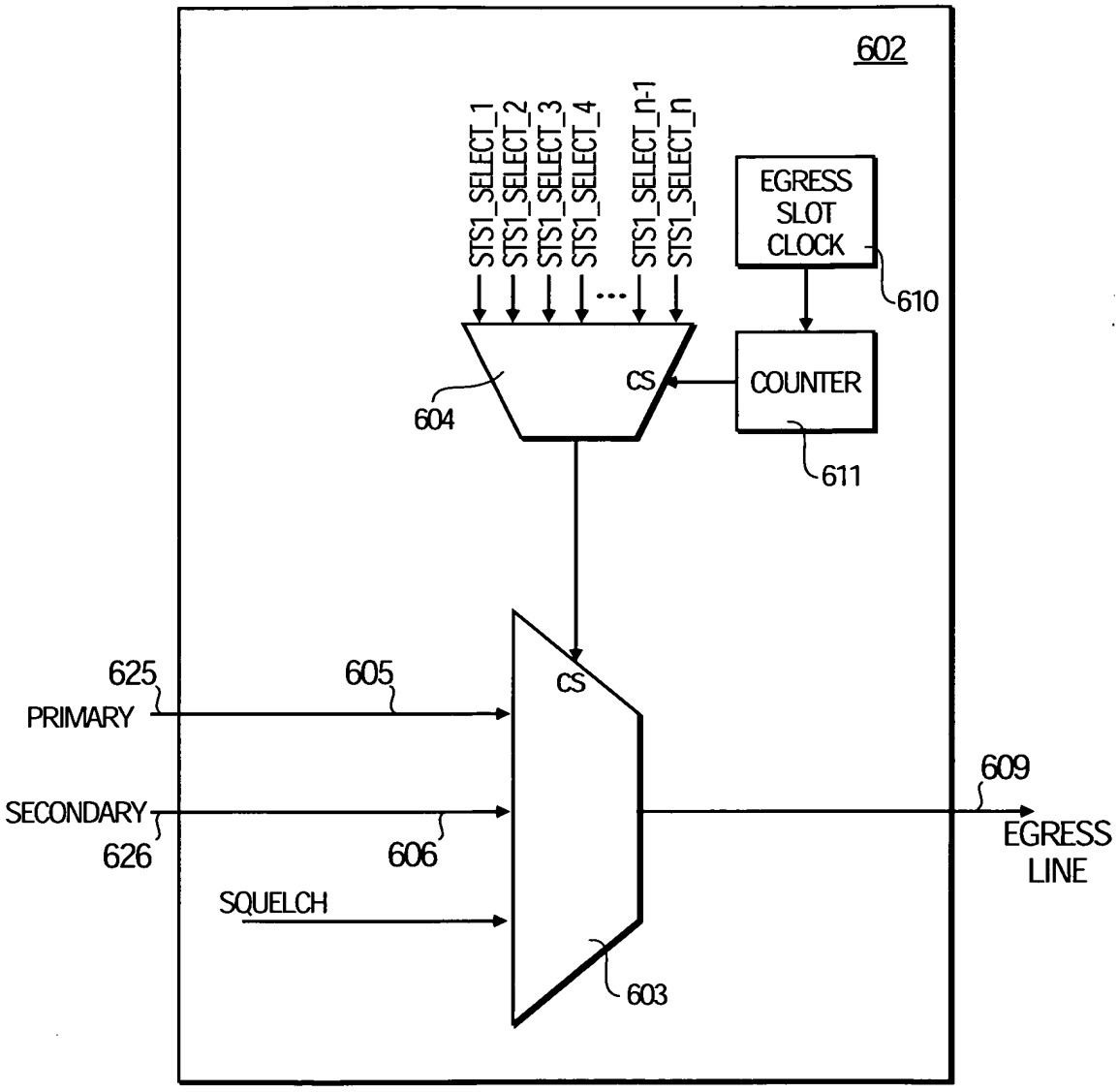

602
STS1_SELECT_1
STS1_SELECT_2
STS1_SELECT_3
STS1_SELECT_4
STS1_SELECT_n-1
STS1_SELECT_n
EGRESS SLOT CLOCK
610
CS
COUNTER
604
611
625
PRIMARY
605
CS
609
SECONDARY
626
606
EGRESS LINE
SQUELCH
603

FIG. 6

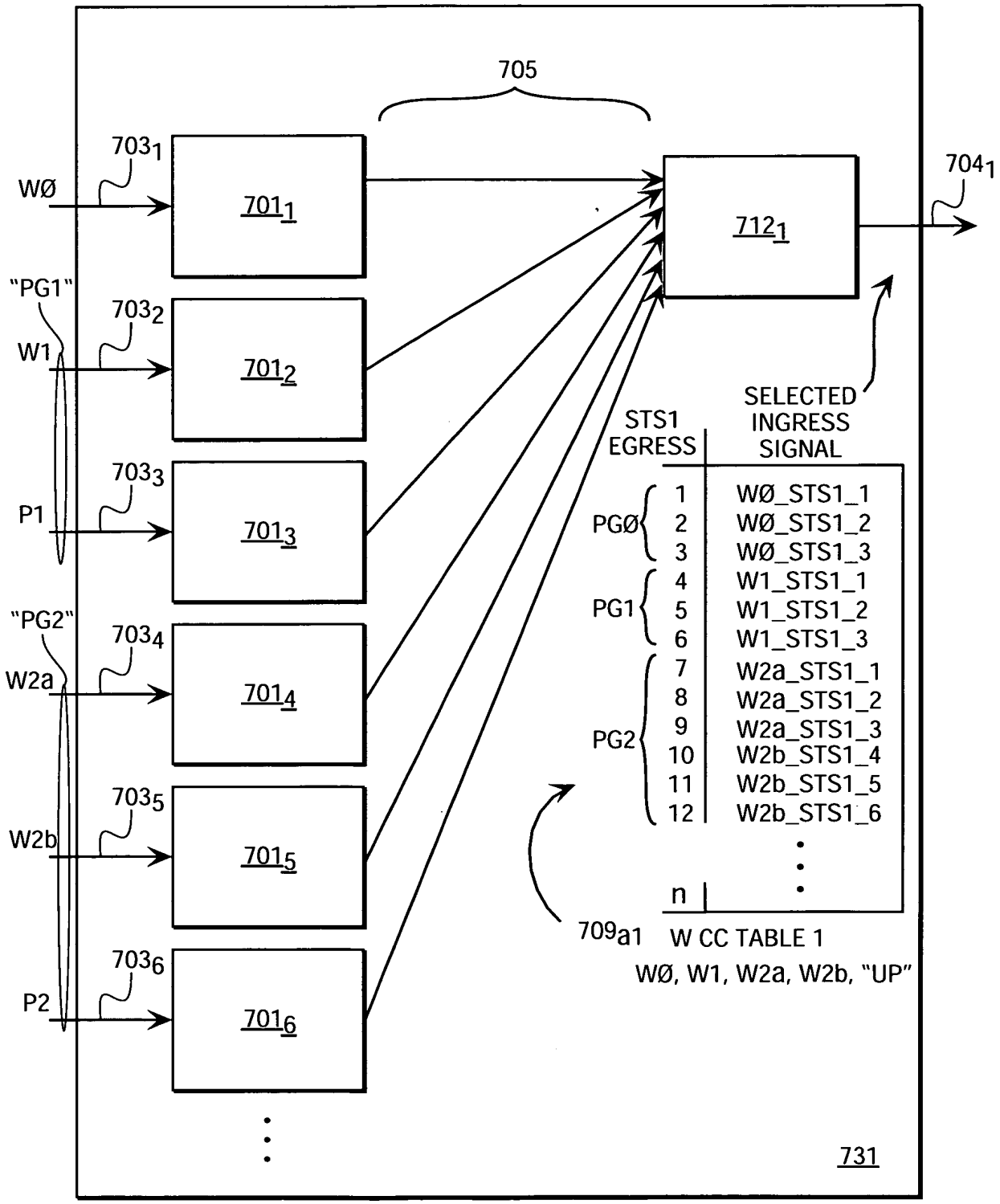

705
703_1
WØ
701_1
712_1
704_1
"PG1"
703_2
W1
701_2
SELECTED INGRESS SIGNAL
STS1 EGRESS
703_3
P1
701_3
PGØ
1 WØ_STS1_1
2 WØ_STS1_2
3 WØ_STS1_3
PG1
4 W1_STS1_1
5 W1_STS1_2
6 W1_STS1_3
"PG2"
703_4
W2a
701_4
PG2
7 W2a_STS1_1
8 W2a_STS1_2
9 W2a_STS1_3
10 W2b_STS1_4
11 W2b_STS1_5
12 W2b_STS1_6
703_5
W2b
701_5
n
709_{a1}
W CC TABLE 1
WØ, W1, W2a, W2b, "UP"
703_6
P2
701_6
731

FIG. 7

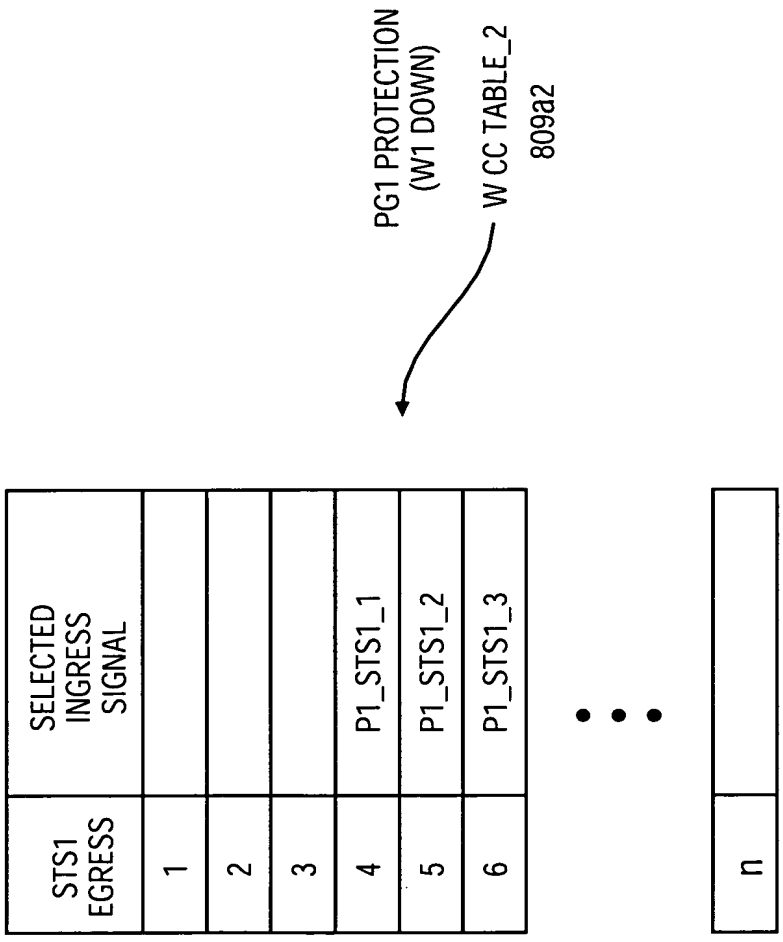

PG1 PROTECTION
(W1 DOWN)
W CC TABLE_2
809a2
STS1 EGRESS
SELECTED INGRESS SIGNAL
1
2
3
4
P1_STS1_1
5
P1_STS1_2
6
P1_STS1_3
n

FIG. 8A

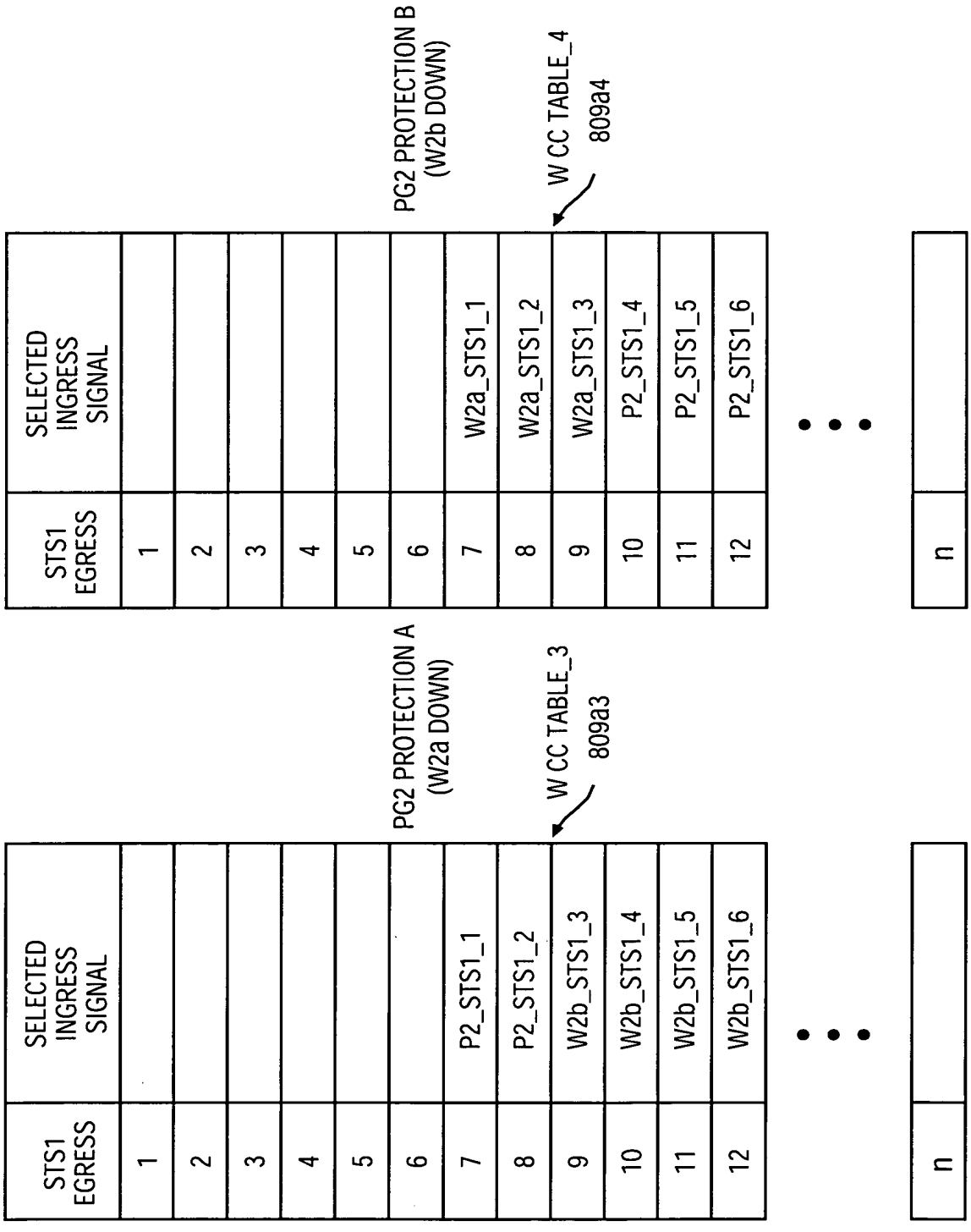

PG2 PROTECTION A
(W2a DOWN)
W CC TABLE_3
809a3
STS1 EGRESS
SELECTED INGRESS SIGNAL
1
2
3
4
5
6
7 P2_STS1_1
8 P2_STS1_2
9 W2b_STS1_3
10 W2b_STS1_4
11 W2b_STS1_5
12 W2b_STS1_6
n
PG2 PROTECTION B
(W2b DOWN)
W CC TABLE_4
809a4
STS1 EGRESS
SELECTED INGRESS SIGNAL
1
2
3
4
5
6
7 W2a_STS1_1
8 W2a_STS1_2
9 W2a_STS1_3
10 P2_STS1_4
11 P2_STS1_5
12 P2_STS1_6
n

FIG. 8B

STS1 EGRESS	APPLICABLE PROTECTION GROUP
1	PGØ
2	PGØ
3	PGØ
4	PG1
5	PG1
6	PG1
7	PG2
8	PG2
9	PG2
10	PG2
11	PG2
12	PG2
⋮	
n	

PRIMARY PG TABLE 908a

FIG. 9A

LINE STATUS	PGØ STAT A	PG1 STAT A	PG2 STAT A	
WØ, W1, W2a, W2b, "UP"	1	1	1	
W1 "DOWN"	1	2	1	
W2a "DOWN"	1	1	3	
W2b "DOWN"	1	1	4	•••
W1 "DOWN", W2a "DOWN"	1	2	3	
W1 "DOWN", W2b "DOWN"	1	2	4	
W1 "DOWN", W2a "DOWN", W2b "DOWN"	1	2	3	
W2a "DOWN", W2b "DOWN"	1	1	3	
	⋮			

FIG. 9B

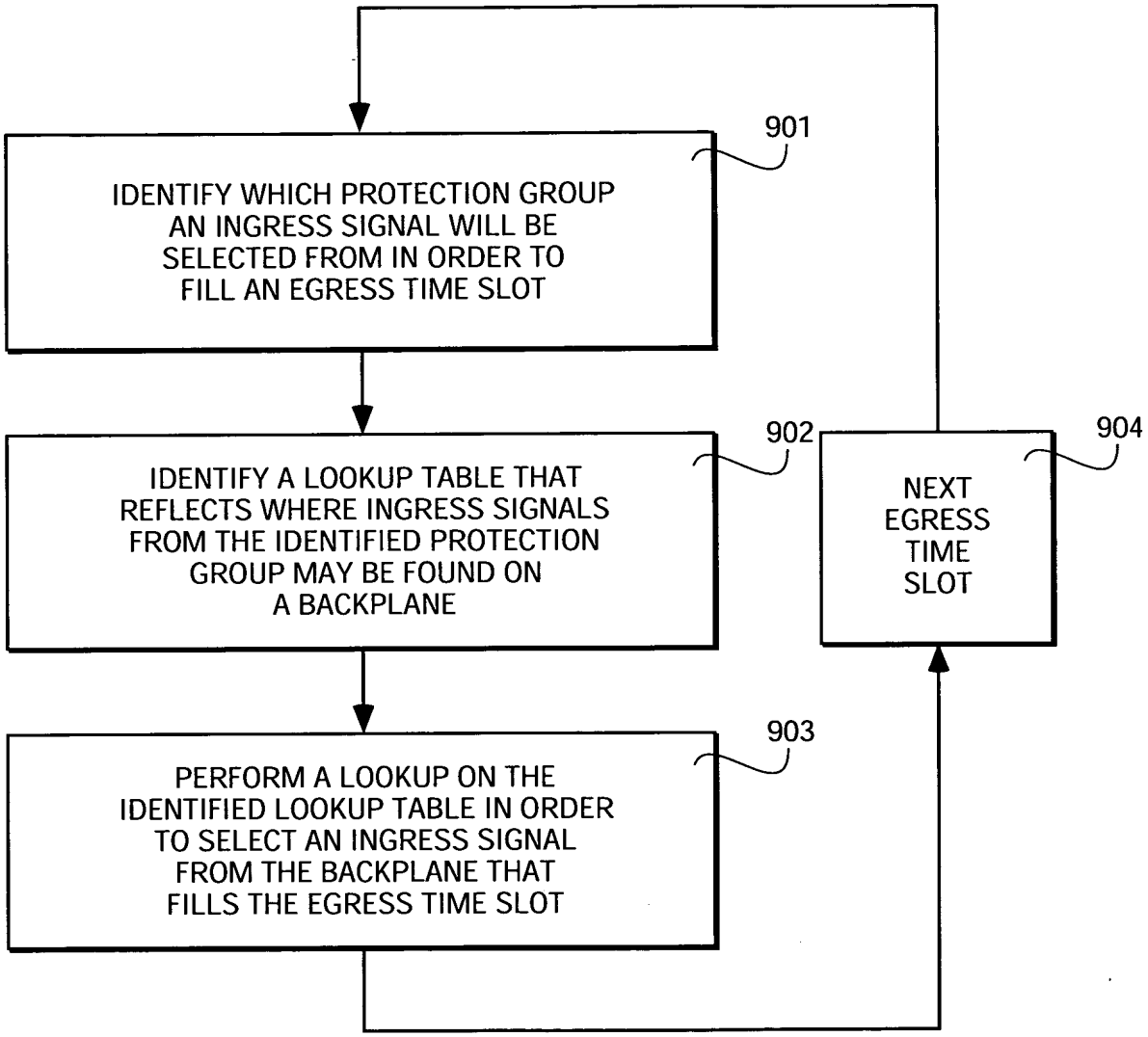

901
IDENTIFY WHICH PROTECTION GROUP AN INGRESS SIGNAL WILL BE SELECTED FROM IN ORDER TO FILL AN EGRESS TIME SLOT
902
IDENTIFY A LOOKUP TABLE THAT REFLECTS WHERE INGRESS SIGNALS FROM THE IDENTIFIED PROTECTION GROUP MAY BE FOUND ON A BACKPLANE
903
PERFORM A LOOKUP ON THE IDENTIFIED LOOKUP TABLE IN ORDER TO SELECT AN INGRESS SIGNAL FROM THE BACKPLANE THAT FILLS THE EGRESS TIME SLOT
904
NEXT EGRESS TIME SLOT

FIG. 9C

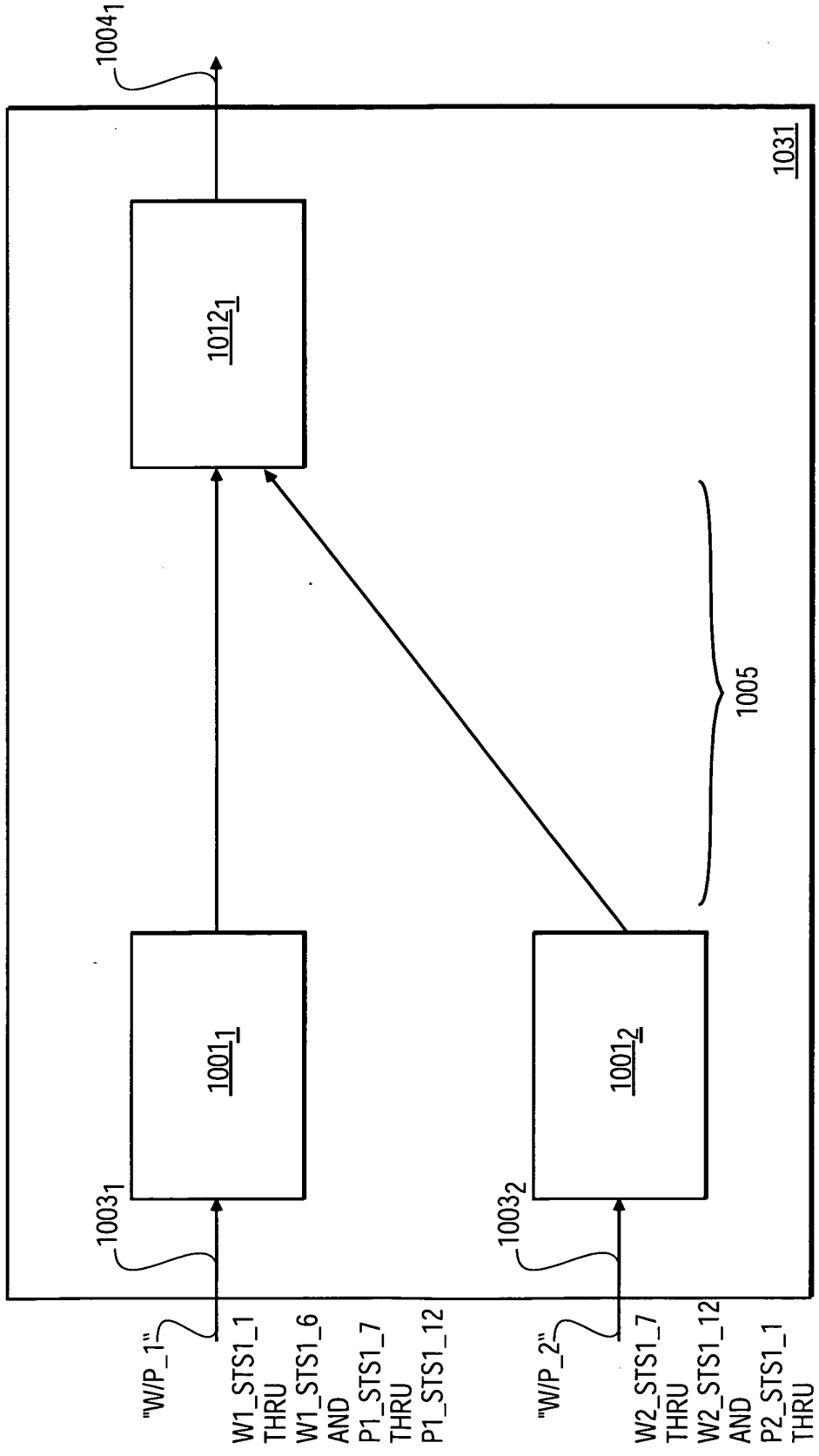

1004₁
1031
1012₁
1001₁
1001₂
1003₁
1003₂
1005
"W/P_1"
W1_STS1_1
THRU
W1_STS1_6
AND
P1_STS1_7
THRU
P1_STS1_12
"W/P_2"
W2_STS1_7
THRU
W2_STS1_12
AND
P2_STS1_1
THRU
P2_STS1_6

FIG. 10A

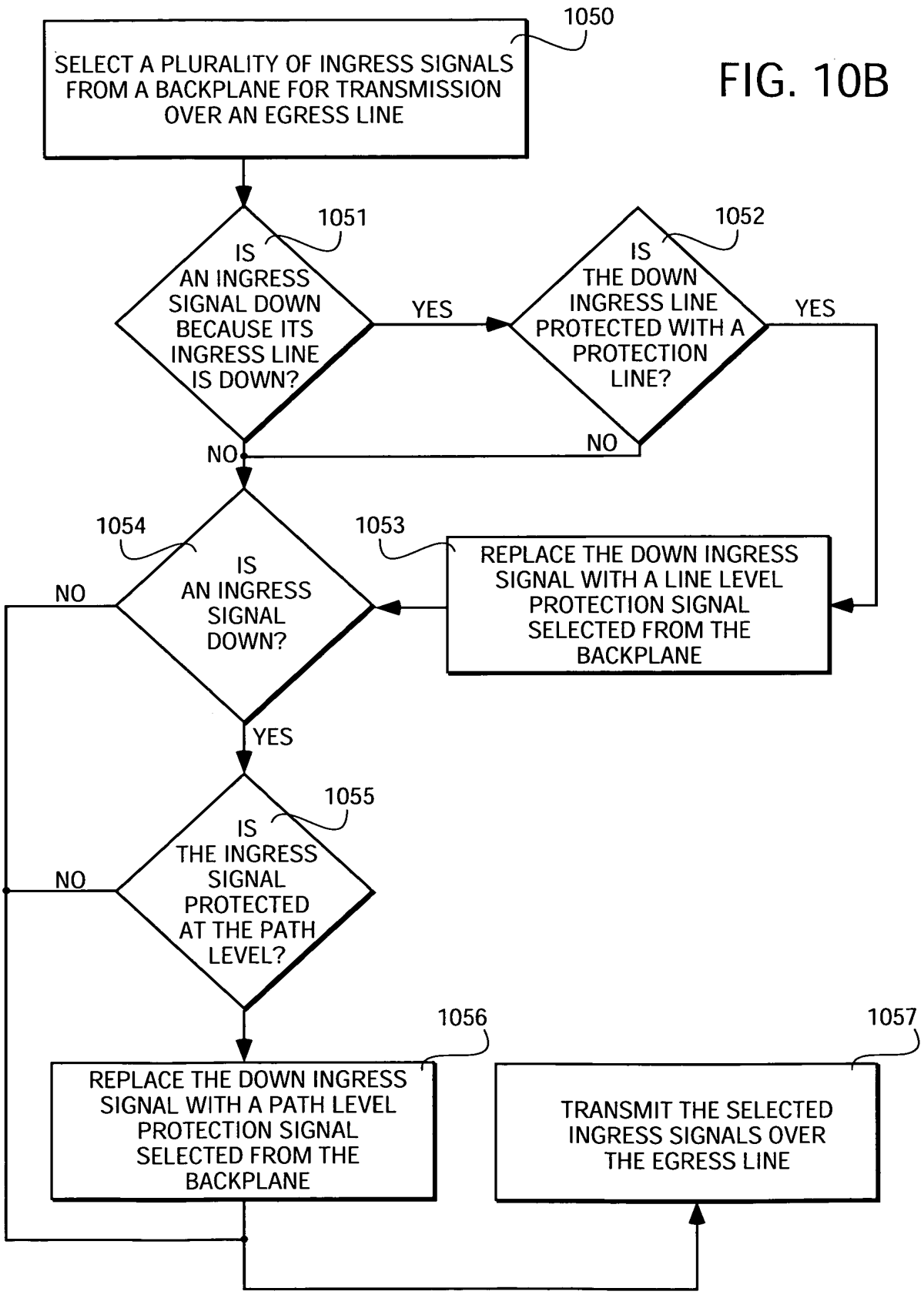

1050
SELECT A PLURALITY OF INGRESS SIGNALS FROM A BACKPLANE FOR TRANSMISSION OVER AN EGRESS LINE
1051
IS AN INGRESS SIGNAL DOWN BECAUSE ITS INGRESS LINE IS DOWN?
YES
1052
IS THE DOWN INGRESS LINE PROTECTED WITH A PROTECTION LINE?
YES
NO
NO
1054
IS AN INGRESS SIGNAL DOWN?
NO
1053
REPLACE THE DOWN INGRESS SIGNAL WITH A LINE LEVEL PROTECTION SIGNAL SELECTED FROM THE BACKPLANE
YES
1055
IS THE INGRESS SIGNAL PROTECTED AT THE PATH LEVEL?
NO
1056
REPLACE THE DOWN INGRESS SIGNAL WITH A PATH LEVEL PROTECTION SIGNAL SELECTED FROM THE BACKPLANE
1057
TRANSMIT THE SELECTED INGRESS SIGNALS OVER THE EGRESS LINE

FIG. 10B

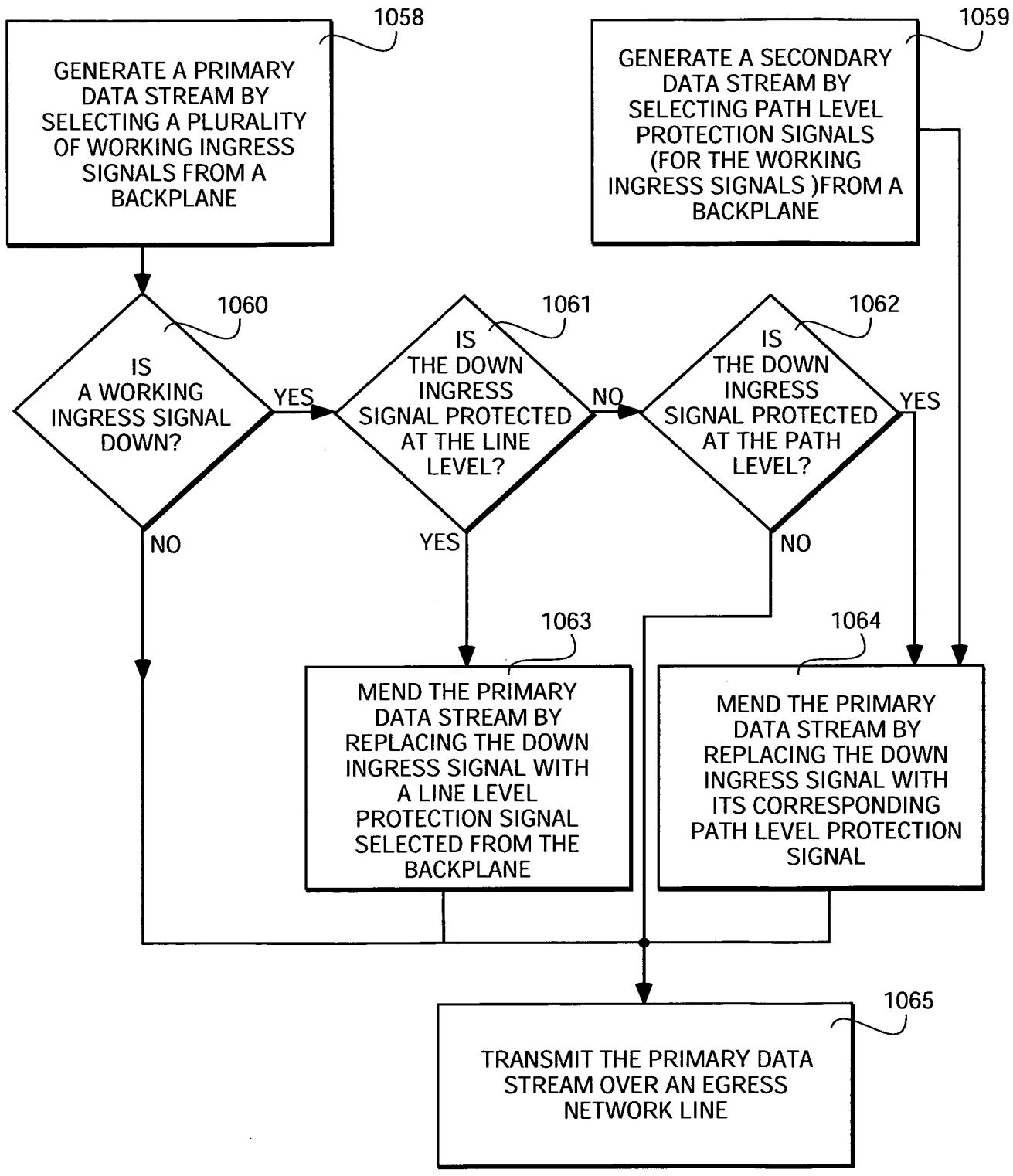

1058
GENERATE A PRIMARY DATA STREAM BY SELECTING A PLURALITY OF WORKING INGRESS SIGNALS FROM A BACKPLANE
1059
GENERATE A SECONDARY DATA STREAM BY SELECTING PATH LEVEL PROTECTION SIGNALS (FOR THE WORKING INGRESS SIGNALS)FROM A BACKPLANE
1060
IS A WORKING INGRESS SIGNAL DOWN?
YES
NO
1061
IS THE DOWN INGRESS SIGNAL PROTECTED AT THE LINE LEVEL?
NO
YES
1062
IS THE DOWN INGRESS SIGNAL PROTECTED AT THE PATH LEVEL?
YES
NO
1063
MEND THE PRIMARY DATA STREAM BY REPLACING THE DOWN INGRESS SIGNAL WITH A LINE LEVEL PROTECTION SIGNAL SELECTED FROM THE BACKPLANE
1064
MEND THE PRIMARY DATA STREAM BY REPLACING THE DOWN INGRESS SIGNAL WITH ITS CORRESPONDING PATH LEVEL PROTECTION SIGNAL
1065
TRANSMIT THE PRIMARY DATA STREAM OVER AN EGRESS NETWORK LINE

FIG. 10C

STS1 EGRESS	SELECTED INGRESS SIGNAL
1	W1_STS1_1
2	W1_STS1_2
3	W1_STS1_3
4	W1_STS1_4
5	W1_STS1_5
6	W1_STS1_6
7	W2_STS1_7
8	W2_STS1_8
9	W2_STS1_9
10	W2_STS1_1Ø
11	W2_STS1_11
12	W2_STS1_12
⋮	⋮
n	

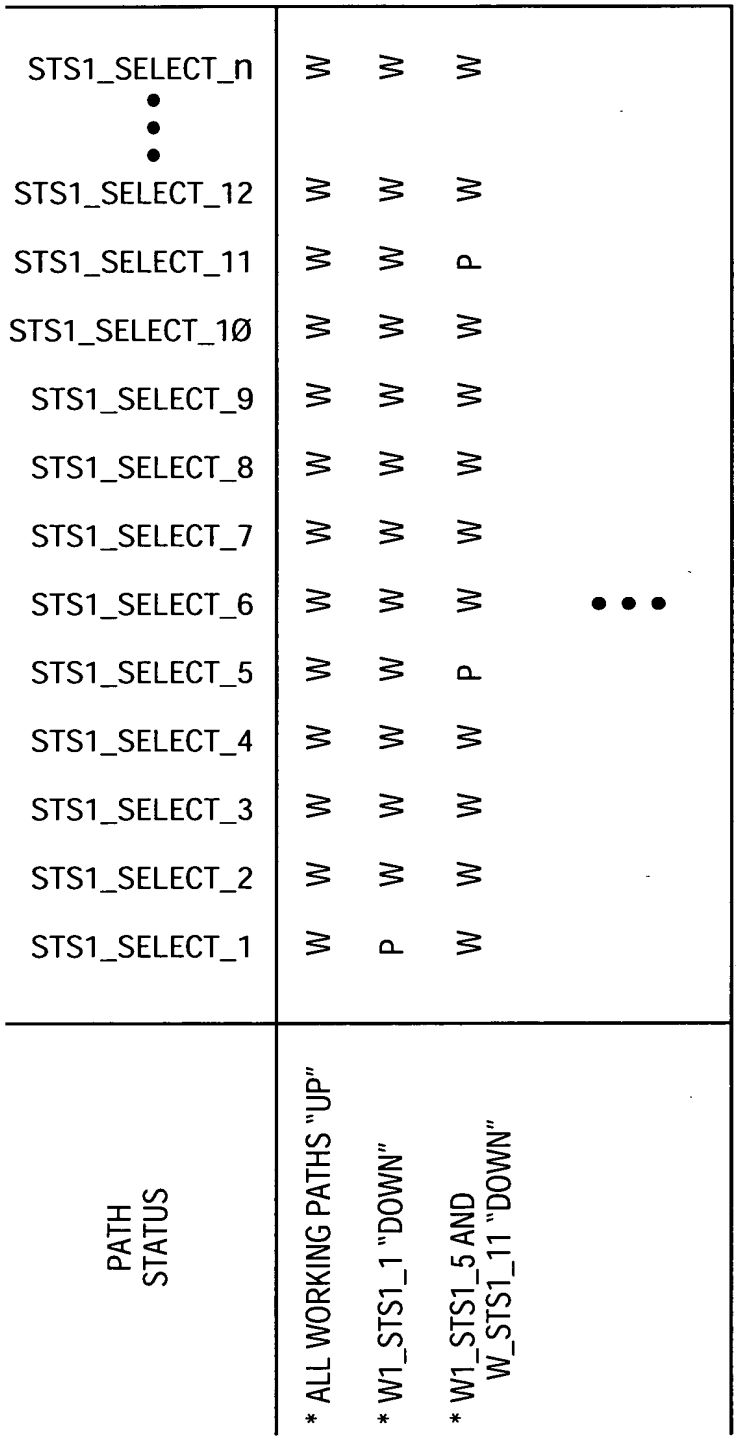
W CC TABLE_1
1109a1

FIG. 11A

STS1 EGRESS	SELECTED INGRESS SIGNAL
1	P2_STS1_1
2	P2_STS1_2
3	P2_STS1_3
4	P2_STS1_4
5	P2_STS1_5
6	P2_STS1_6
7	P1_STS1_7
8	P1_STS1_8
9	P1_STS1_9
10	P1_STS1_1Ø
11	P1_STS1_11
12	P1_STS1_12
⋮	⋮
n	

P CC TABLE_1
1109b1

FIG. 11B


PATH STATUS
* ALL WORKING PATHS "UP"
* W1_STS1_1 "DOWN"
* W1_STS1_5 AND W_STS1_11 "DOWN"
STS1_SELECT_n
STS1_SELECT_12
STS1_SELECT_11
STS1_SELECT_10
STS1_SELECT_9
STS1_SELECT_8
STS1_SELECT_7
STS1_SELECT_6
STS1_SELECT_5
STS1_SELECT_4
STS1_SELECT_3
STS1_SELECT_2
STS1_SELECT_1
W W W
P W W
W W P W W W

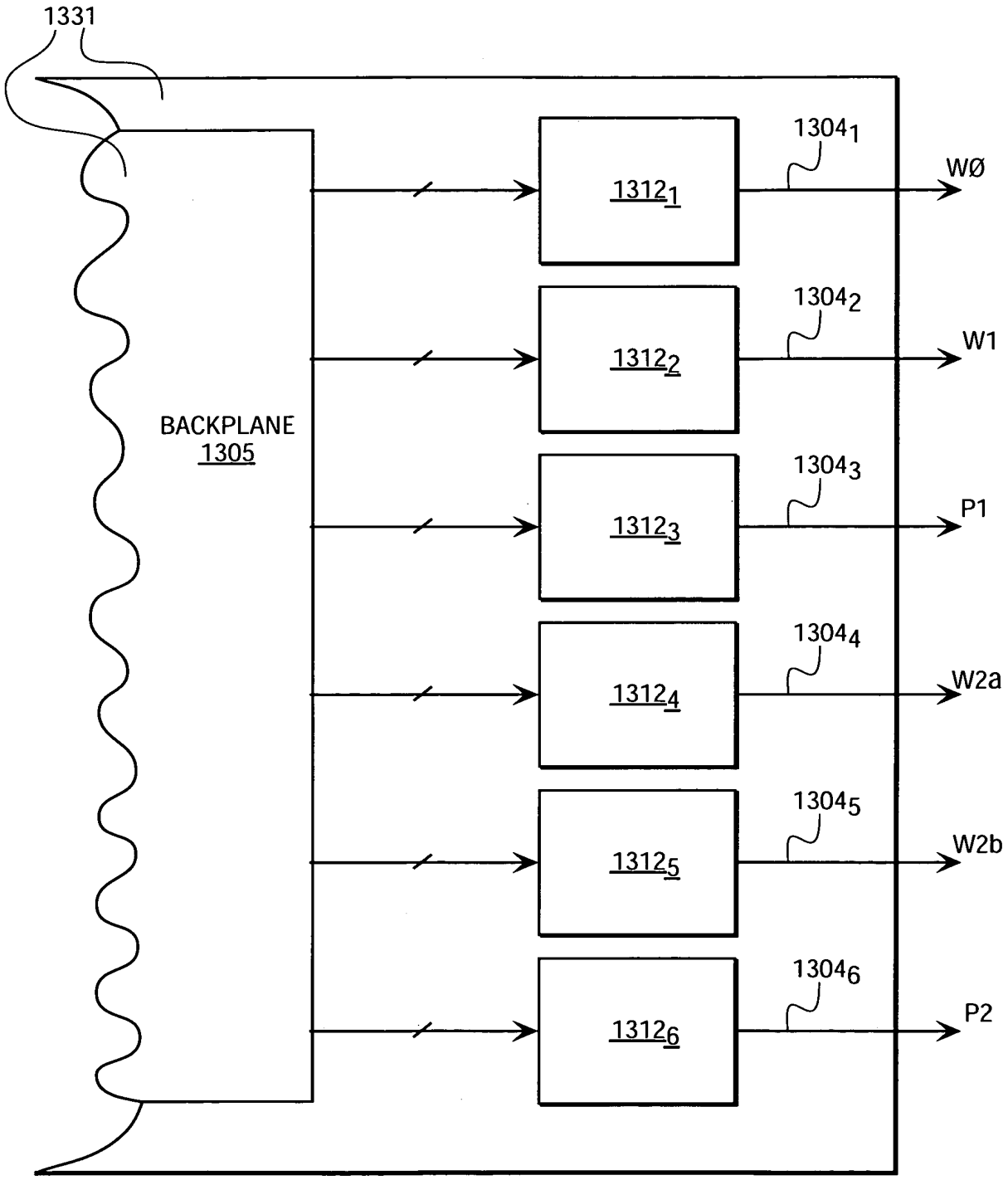

1331
BACKPLANE
1305
1312 1
1312 2
1312 3
1312 4
1312 5
1312 6
1304 1
1304 2
1304 3
1304 4
1304 5
1304 6
WØ
W1
P1
W2a
W2b
P2

FIG. 13

STS EGRESS	SELECTED INGRESS SIGNAL
1	W2a_STS1_W_1
2	W2a_STS1_W_2
3	W2a_STS1_W_3
4	W2a_STS1_W_4
	• • •
n	W2a_STS1_W_n

W_CC_TABLE_1
1409a1

FIG. 14A

STS EGRESS	SELECTED INGRESS SIGNAL
1	W2a_STS1_P_1
2	W2a_STS1_P_2
3	W2a_STS1_P_3
4	W2a_STS1_P_4
	• • •
n	W2a_STS1_P_n

W_CC_TABLE_2
1409a2

FIG. 14B

STS EGRESS	SELECTED INGRESS SIGNAL
1	W2b_STS1_W_1
2	W2b_STS1_W_2
3	W2b_STS1_W_3
4	W2b_STS1_W_4
	• • •
n	W2b_STS1_W_n

W_CC_TABLE_3
1409a3

FIG. 14C

STS EGRESS	SELECTED INGRESS SIGNAL
1	W2b_STS1_P_1
2	W2b_STS1_P_2
3	W2b_STS1_P_3
4	W2b_STS1_P_4
	• • •
n	W2b_STS1_P_n

W_CC_TABLE_4
1409a4

FIG. 14D

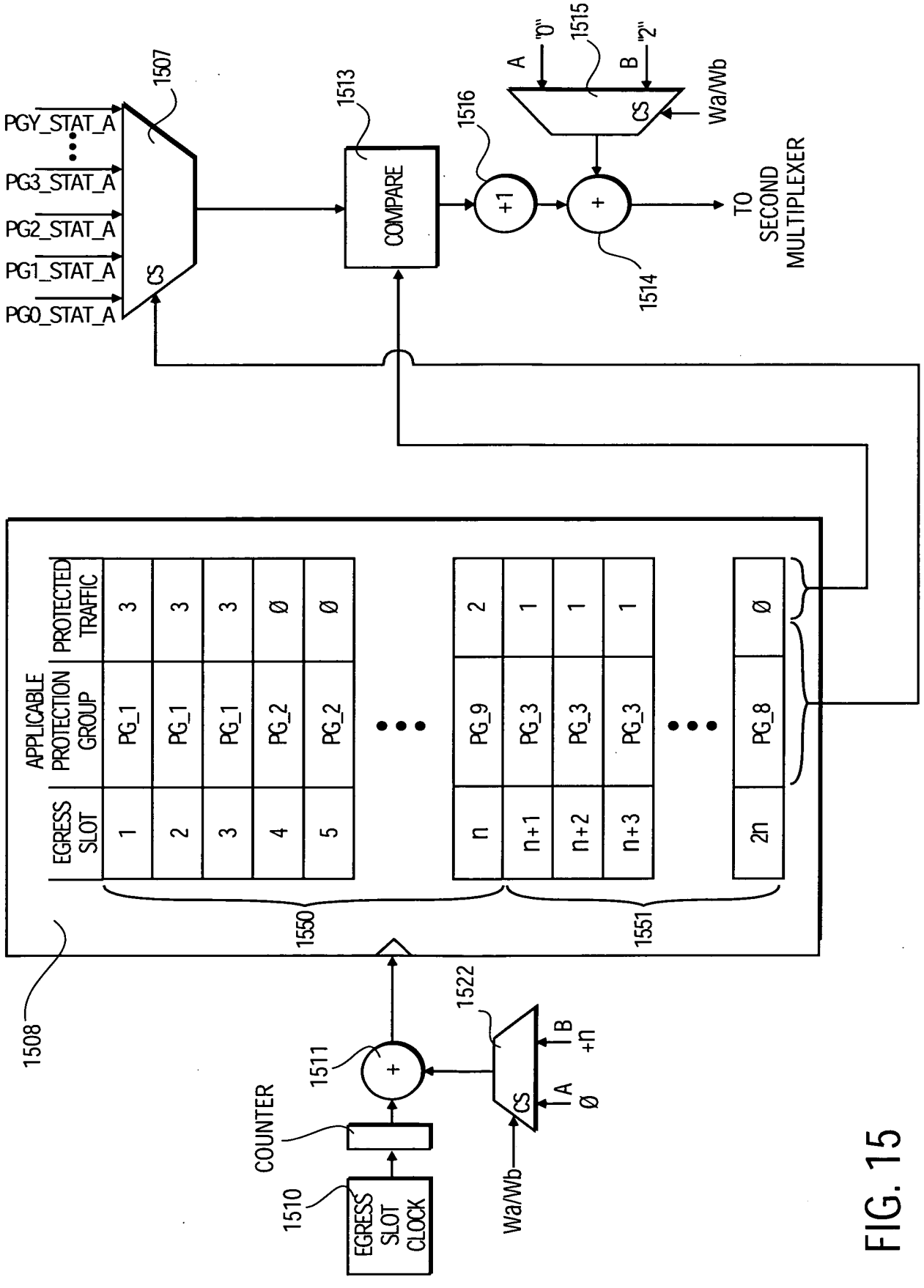

PGY_STAT_A
PG3_STAT_A
PG2_STAT_A
PG1_STAT_A
PG0_STAT_A
CS
1507
COMPARE
1513
+1
1516
A
"0"
B
"2"
1515
CS
Wa/Wb
+
1514
TO SECOND MULTIPLEXER
1508
APPLICABLE PROTECTION GROUP
PROTECTED TRAFFIC
EGRESS SLOT
1 PG_1 3
2 PG_1 3
3 PG_1 3
4 PG_2 Ø
5 PG_2 Ø
n PG_9 2
n+1 PG_3 1
n+2 PG_3 1
n+3 PG_3 1
2n PG_8 Ø
1550
1551
1522
B
+n
A
Ø
CS
Wa/Wb
1511
+
COUNTER
1510
EGRESS SLOT CLOCK

FIG. 15